Bering Sea and Aleutian Islands Shortraker Rockfish

Kalei Shotwell and Jane Sullivan, November Groundfish Plan Team 2024

Contributors: Matt Callahan, Katy Echave, Wes Larson, Ivonne Ortiz, Paul Spencer, Steven Whitney

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Stock Overview

- Shortraker rockfish (*Sebastes borealis*, SR), Tier: 5
- Area: Eastern Bering Sea (EBS) Slope and Aleutian Islands (AI)
- Not being subject to overfishing
- Data changes: updated catch, bottom trawl survey (BTS) biomass estimates (AI 2024), AFSC longline survey (LLS) relative population weights (RPWs) on EBS slope (2023)
- Update Assessment: no changes to assessment methodology, using Model 22 with updated data = Model 22_2024
- Recommended ABC: 473 t, 11% decrease from last year's ABC

Teams or SSC Comments in General

- SSC suggests the GPT assessment authors coordinate with Dr. Larson to determine if there are results relevant to their species and how any new information might impact the assessment and management of these species (SSC, October 2023)
  - Provide discussion of this in specific comments and stock structure
- SSC supports a three-category risk table, requests categories be revised, use only fishery performance indicators that provide some inference on biological status, consider potential future risks, include justification for each score (SSC, December 2023)
  - Updated table, discussed with AKRO on fish performance, discussed impact of no longline survey, included justification for each score

Teams or SSC Comments Specific to Assessment

- BSAI GPT encouraged authors to simplify and combine SBS stratum with AI in future, before implementing the change SSC requests background on why used, whether authors recommend change, and justification for change (SSC, December 2022)
  - Provide overview of assessment history and justification for change
- SSC recommends authors re-evaluate current estimate of natural mortality in light of recent tech memo, and continued research to quantify effects of hook competition (SSC, December 2022)
  - Team approach from rockfish authors to determine how best to use the new tech memo and provide best practices guidance in future

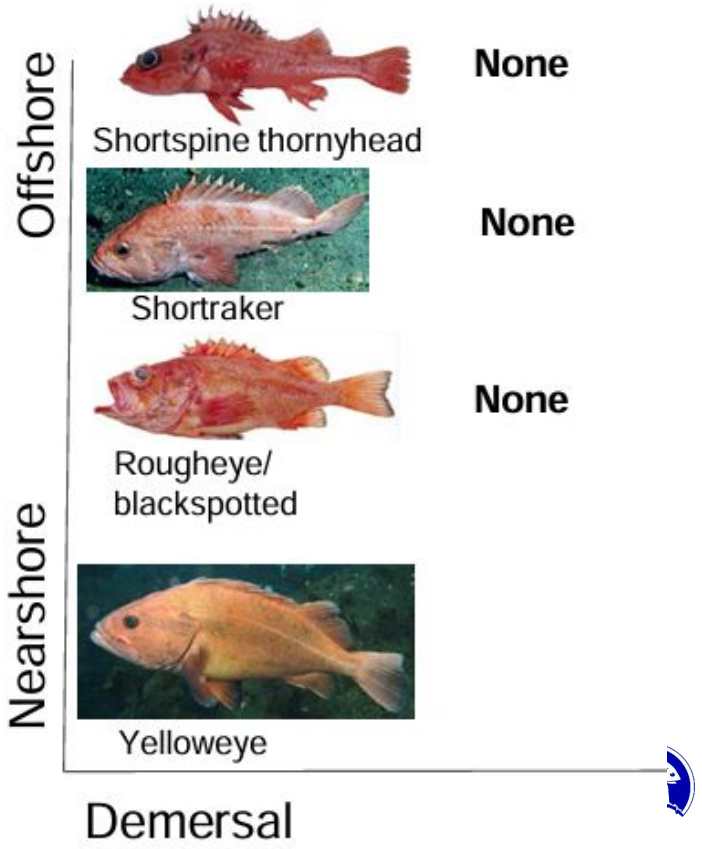
Overview of Assessment History

- Shortraker managed within multiple complexes until 2004 when it was managed by species (but still within the same SAFE chapter)
- Surplus production model and Kalman filter used from 2003 through 2007 on rougheye/shortraker, then on shortraker only from 2008 through 2013, then random effects model from 2014 to 2021, then REMA 2022-present
- Population structure using microsatellite data was observed for shortraker and other rockfish in 2004 which led to an examination of area-specific exploitation rates for subareas of western, central, eastern AI and the southern Bering in 2012 which continued until 2022.
- In 2023, a re-examination of shortraker using whole genome sequencing found no evidence of stock structure throughout the stock range

Response to SSC Comment

- Larsen et al., study suggests high gene flow and regional assessments may be less important (paper soon)
- Ocean current transport from GOA through AI passes allows for larvae to replenish local areas over time
- Recommend simplifying the strata and combining for future assessments

Larsen et al., in prep

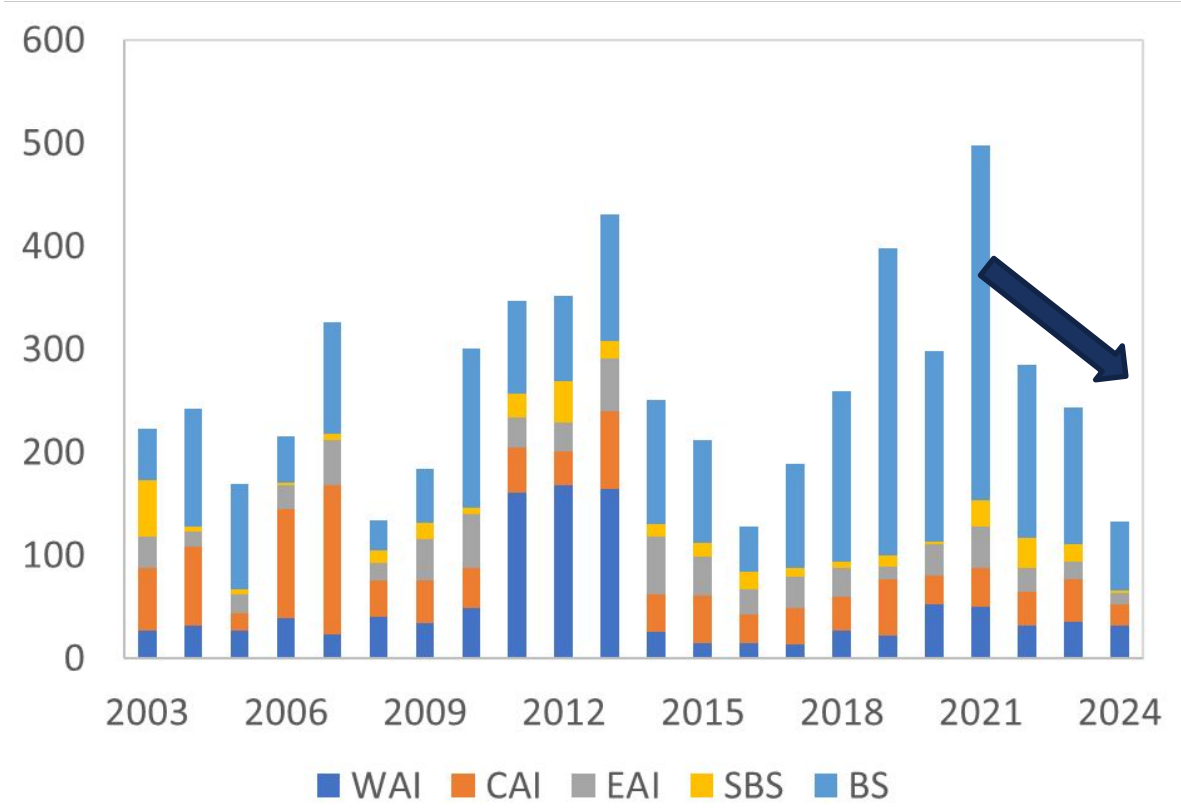


Data Summary

Source	Data	Years
AFSC Bering Sea slope survey	Survey biomass	2002, 2004, 2008, 2010, 2012, 2016
	Length compositions	2002, 2004, 2008, 2010, 2012, 2016
AFSC Aleutian Islands survey	Survey biomass	1991, 1994, 1997, 2000, 2002, 2004, 2006, 2010, 2012, 2014, 2016, 2018, 2022, **2024**
	Length compositions	1991, 1994, 1997, 2000, 2002, 2004, 2006, 2010, 2012, 2014, 2016, 2018, 2022, 2024
AFSC Longline Survey	Relative Population Weights	1997-2021, **2023**
	Length compositions	1997-2023
Fishery	Catch Biomass	2003-2021, **2022-2024**
	Length compositions	2003-2023

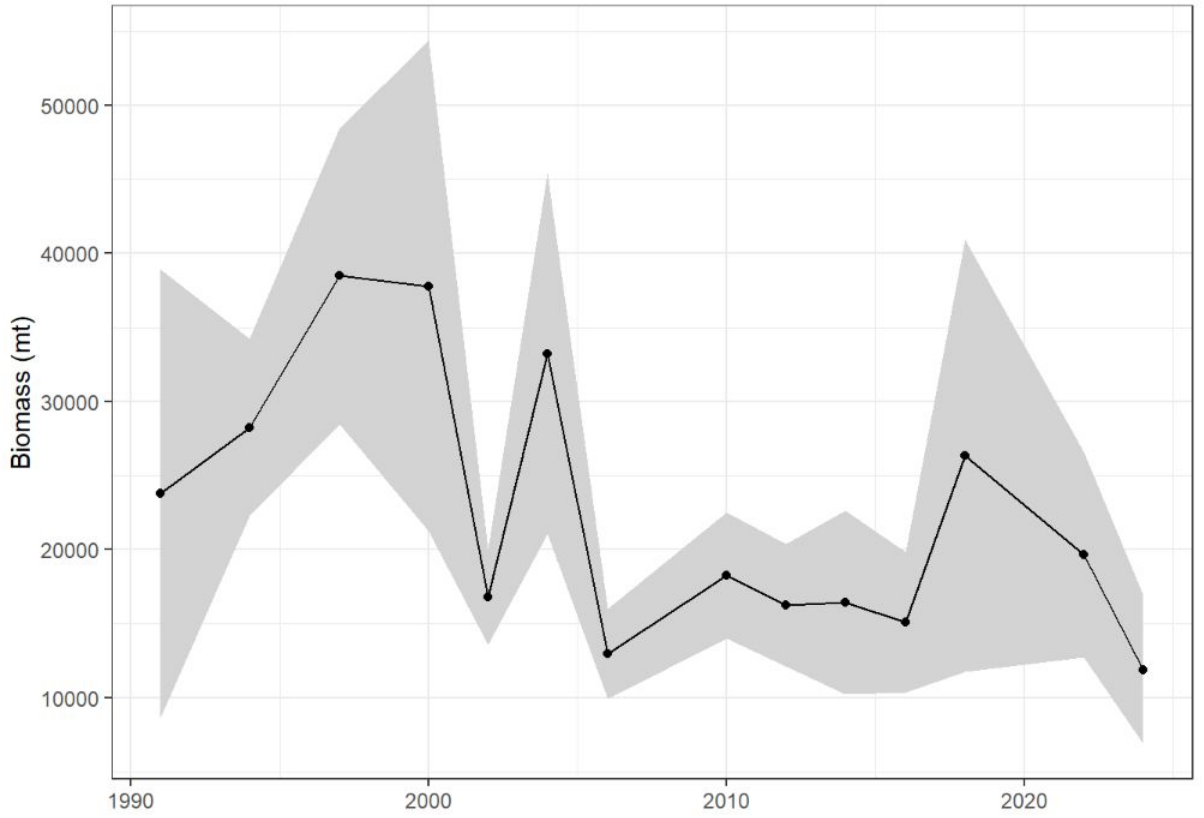
Catch

- Data
  - 1991-2001 recorded in other red rockfish
  - 2001-2003 shortraker/rougheye
  - 2003 species specific catch accounting
  - Catch average 59% of ABC
- Trends
  - On avg catch is 50:50 in AI:BS, more in BS in last decade
  - Shortraker caught during directed fishing for POP since 2010, more recently caught in Atka and sablefish
  - 2022 and 2023 lower catch, about half of ABC (52% and 46%, respectively)

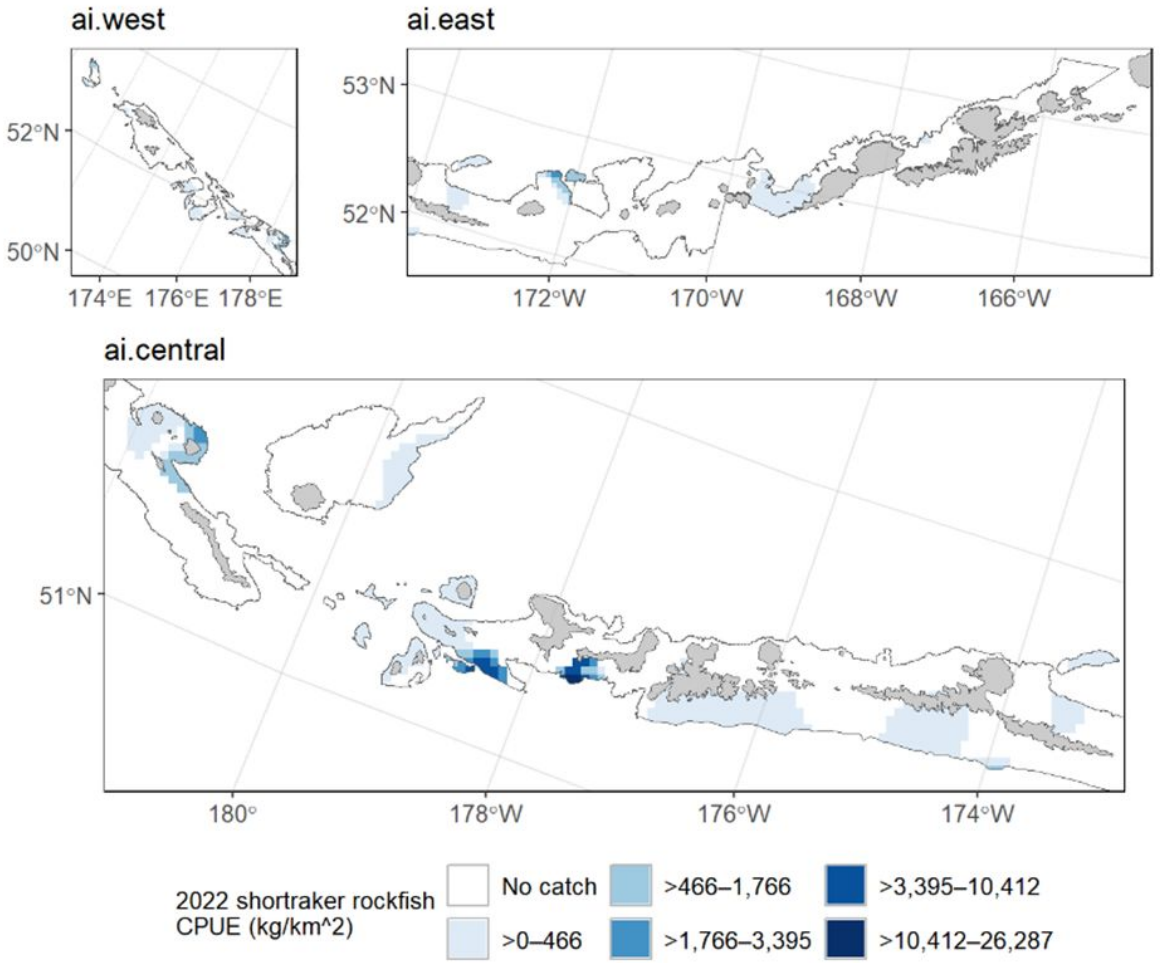


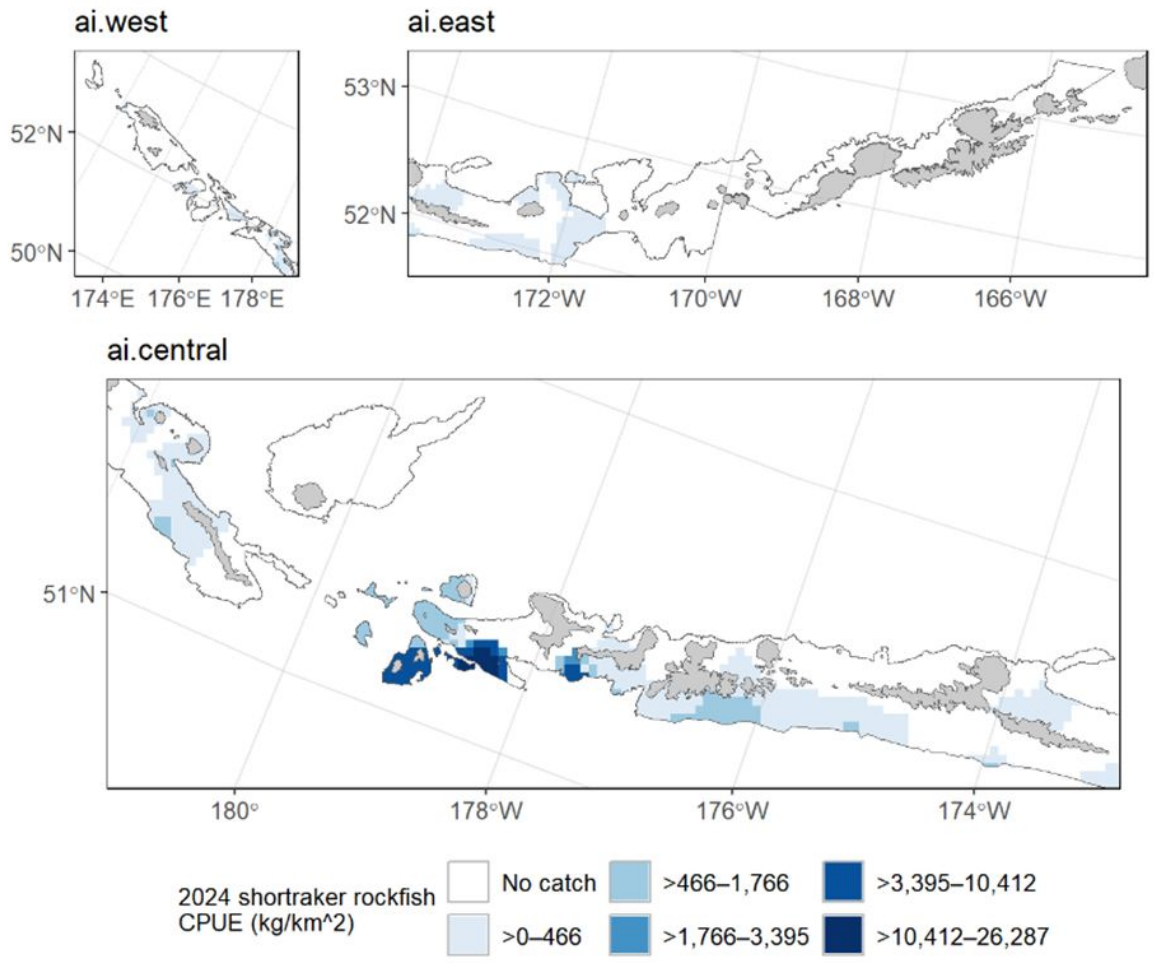
Survey - Aleutian Islands Bottom Trawl

- Data
  - Shortraker reliably identified to species (1980 on)
  - Use standardized survey time series (1991 to present), updated 2024
  - 20% reduction in stations in 2024, variance in deep strata may >
- Trends
  - Variable with occasional large CVs
  - 2024 estimate decreased 40% from 2022
  - 2024 estimate second lowest in the time series (but higher CV)



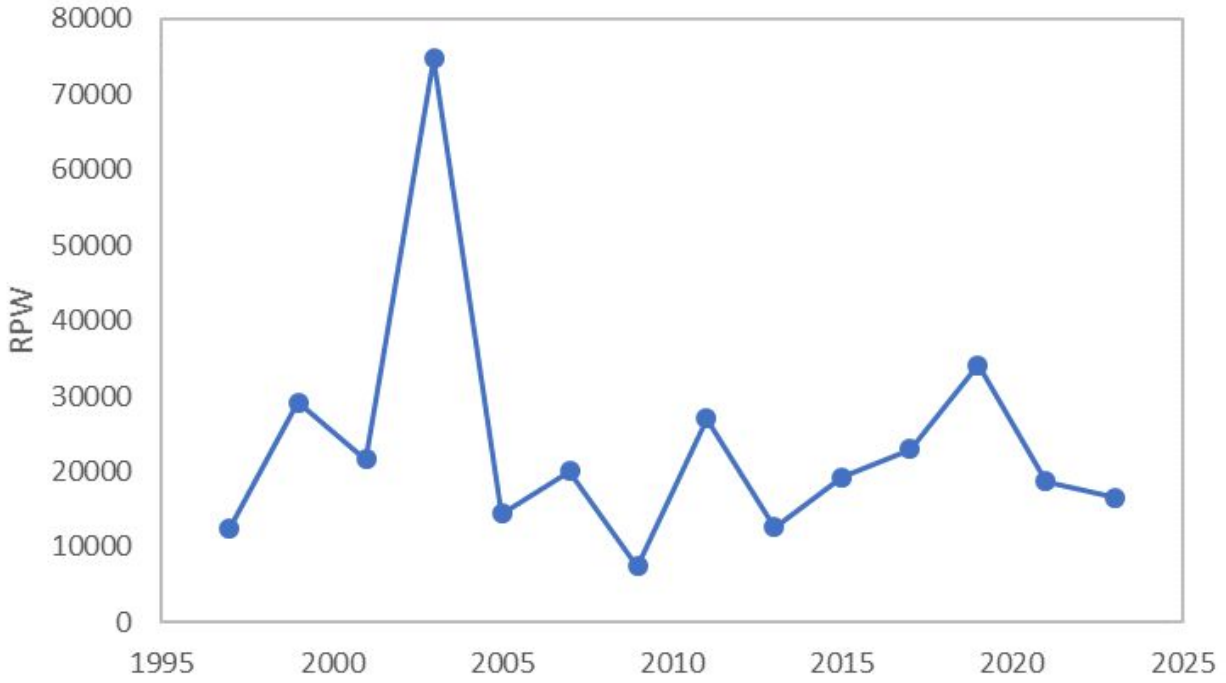
Survey Distribution – AI Bottom Trawl



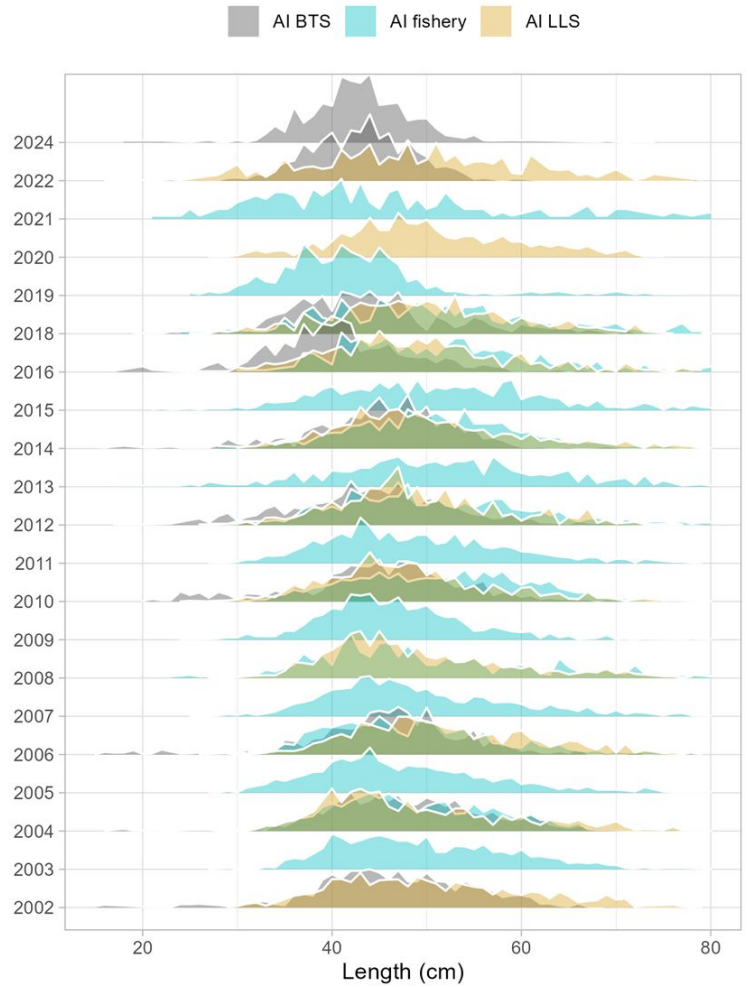


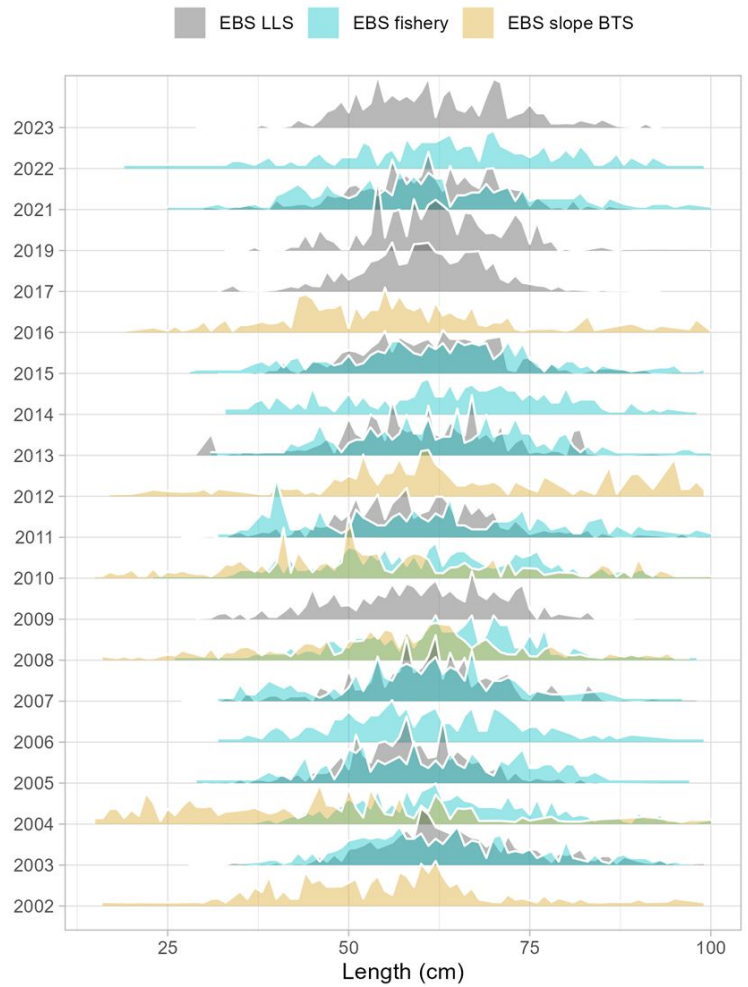
Survey – EBS Longline Survey

- Data
  - Use EBS slope portion of the standard survey (1997 to present)
  - Only used data sampled in odd years when survey in the EBS
- Trends
  - Fairly steady pattern over time with a few peaks
  - 2023 estimate decreased 11% from 2021
  - 2023 estimate now 30% below average



Size Composition

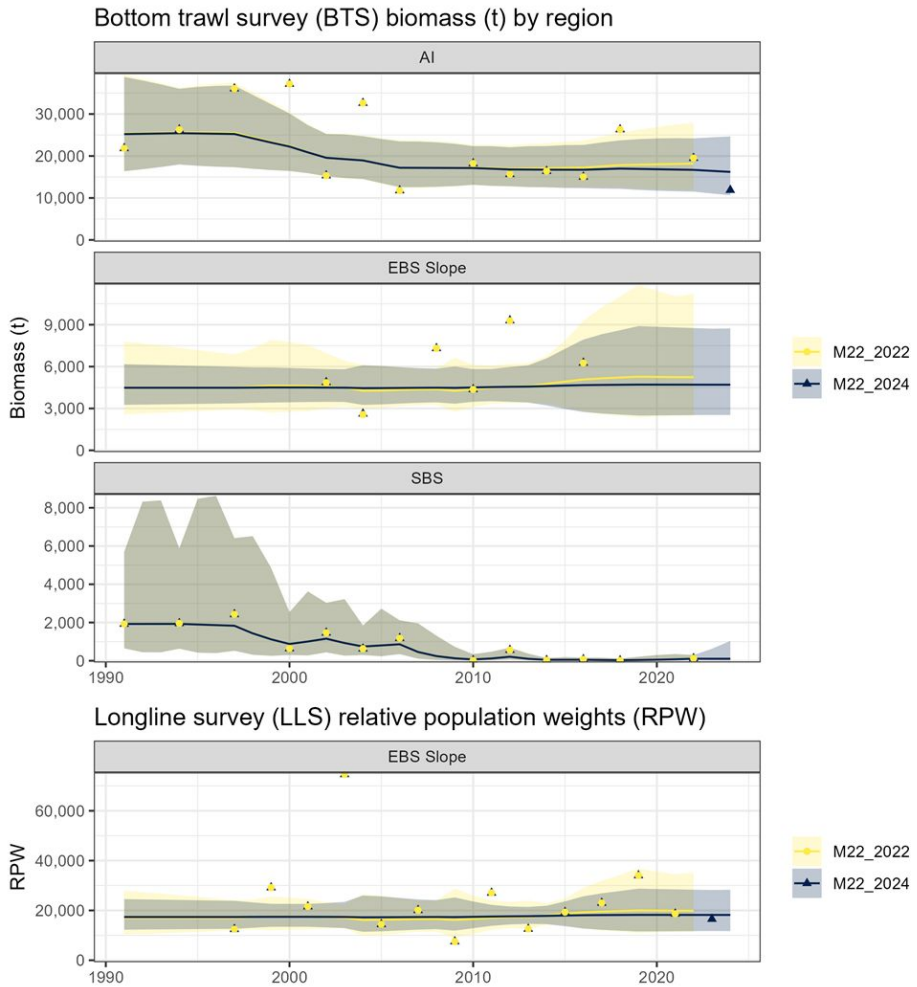


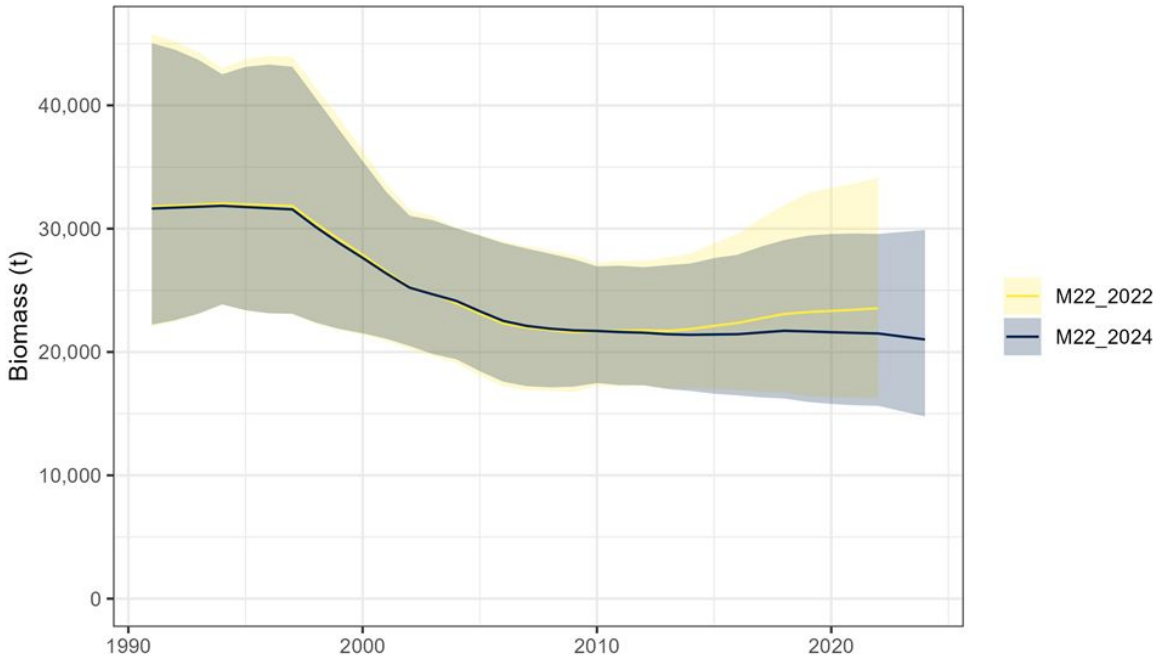


Model Summary and Results

- Model 22 with updated data = Model 22_2024
  - Bottom trawl surveys in the Aleutians (AI), Southern Bering Sea (SBS), eastern Bering Sea (EBS) slope (ended in 2016)
  - AFSC longline survey (LLS) relative population weights (RPW) on the EBS slope
- Review model fit to survey biomass and RPWs
- Review risk table and harvest recommendations

Model Fit - Survey Biomass

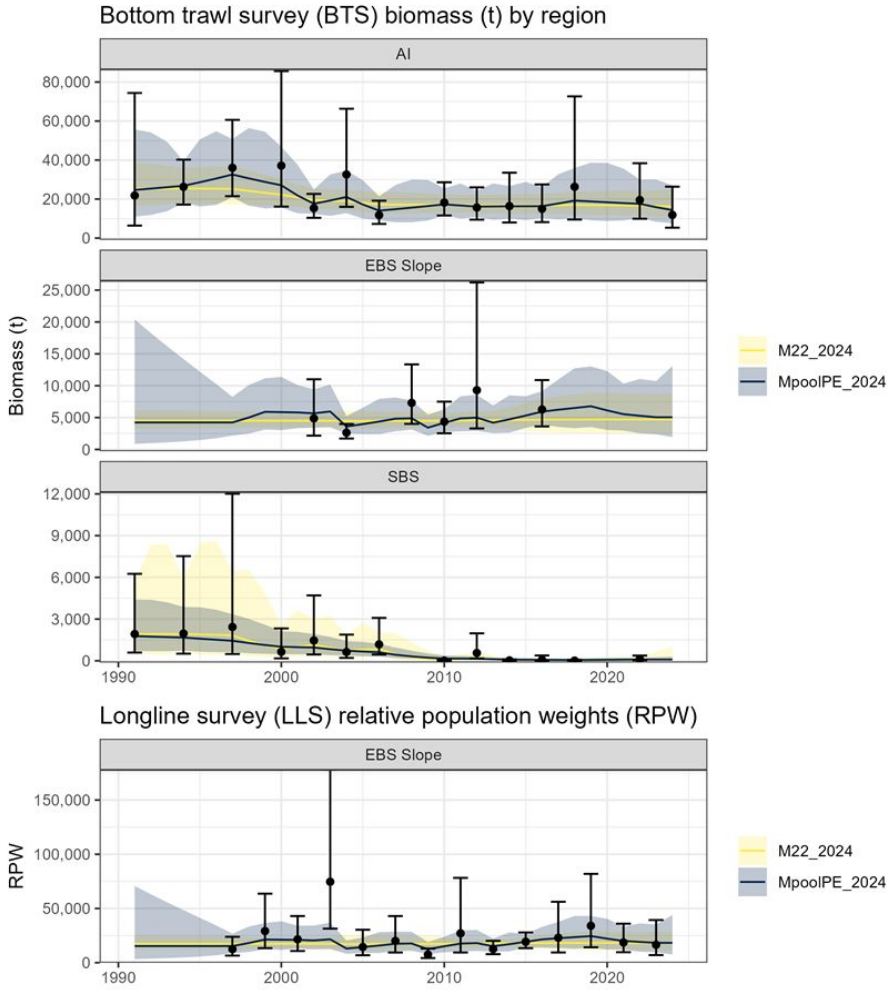




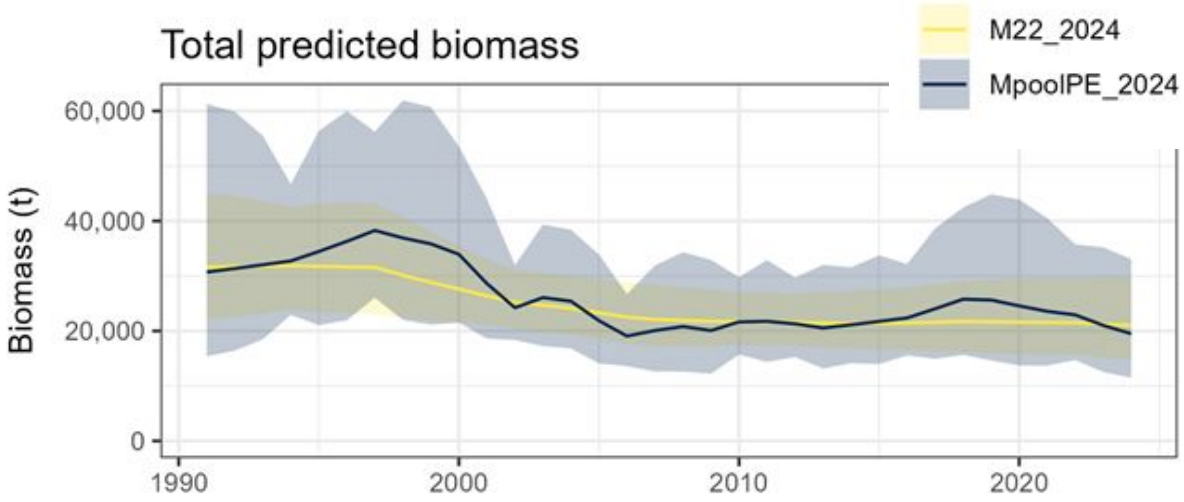
Risk Table: Assessment Level 2

- Assessment –
  - Three surveys for this assessment affords some stability of biomass over time.
  - Little contrast in data and standard error estimates for the process error on the EBS slope are approaching zero with large 95% CIs (no info in data to estimate this parameter).
  - Ran sensitivity using pooled process error, which resulted in better model fit and estimated fixed effects with similar terminal year (-7.3%)
  - Do not recommend stop-gap for this year, but rate this assessment as level 2 concern

Model Fit - Survey Biomass Sensitivity



- Better model fit, similar terminal year biomass estimate
- No sub-area management and new genetics support this
- Will explore in next cycle



Risk Table: Other Categories Level 1

- Pop Dy – biomass slowly trending downward, but little information on early life history of shortraker, length comps show slight increase in <35cm fish in fishery and LLS in the AI, suggests potential increase in recruitment in AI
- Environment (Ortiz) – no clear concerns for shortraker outside of increased temps in AI, prey generalists, no concerning trends in predators
- Fisheries performance – retained as incidental catch, catch half of ABC, related to the POP fishery
- Do not recommended reduction from max ABC

Harvest Recommendation

Quantity	As estimated or *specified last* year for: 2024	2025	As estimated or *recommended this* year for: 2025	2026
M (natural mortality rate)	0.03	0.03	0.03	0.03
Tier	5	5	5	5
Biomass (t)	23,547	23,547	21,018	21,018
F_{OFL}	0.03	0.03	0.03	0.03
$maxF_{ABC}$	0.0225	0.0225	0.0225	0.0225
F_{ABC}	0.0225	0.0225	0.0225	0.0225
OFL (t)	706	706	631	631
maxABC (t)	530	530	473	473
ABC (t)	530	530	473	473
Status	As determined *last* year for: 2022	2023	As determined *this* year for: 2023	2024
Overfishing		n/a		n/a

Conclusions

- Summary
  - Recommend Model 22_2024 that uses the longline survey and so is robust to loss of slope bottom trawl survey
  - No reduction from max ABC, but plan to revisit the stratification and process error in the next cycle
  - ABC = 473 t, OFL = 631 t
- Data Gaps and Future Research Priorities
  - Work with other rockfish authors for guidance on M tech memo
  - Incorporate any future research on effects of hook competition

Thank You!

CONTACTS:

KALEI.SHOTWELL@NOAA.GOV

Survey Options - Background

- Data Options
  - Original data is from EBS slope and AI BTS (color coded strata)
  - New data from longline survey (circles and triangles)
  - Shortraker not observed on the EBS shelf
- Spatial Match
  - LLS in AI (circles) and AI strata do not overlap completely
  - LLS in EBS (triangles) cover entire length of EBS slope BTS